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ABSTRACT

The Multidimensional Health Locus of Control (MHLC) scales have been used both to evaluate program effects and to assign subjects to treatment modalities. This study explored the construct validity of scores from the MHLC scales when the measure is used with adults who solicit intervention to promote their own health. The MHLC measures health locus of control along multiple dimensions (powerful others, chance, and internal). Subjects were 692 adult faculty or staff members (mean age 41.3 years) at a large southwestern state university who were seeking voluntary health promotion services. There were approximately equal numbers of men and women. Principal components analysis found that the 3 factors (dimensions) accounted for 41.5% of the total variance. Overall, results support the three-dimensional structure set forth by the test developers. All but 1 of the 18 items from the scales loaded on the appropriate a priori subscales. Results suggest that the instrument tends to yield valid scores when used with adults seeking voluntary health promotion activities. One tables presents study findings. A 30-item list of references is included. (SLD)

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# Validity of the Multidimensional Health Locus of Control Scales in a Health Promotion Program: An Investigation of Factor Structure

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ABSTRACT

The Multidimensional Health Locus of Control scales have been used both to evaluate program effects and to assign subjects to treatment modalities. The present study explored the construct validity of scores from the scales when the measure is used with adults. Subjects were 692 adults seeking voluntary health promotion services.

In recent years there has been increased interest in the role of personality variables in preventive health behavior (Taylor, 1986). Among the variables that have received substantial attention is locus of control. The initial works in this area described the locus of control construct as the degree to which individuals attribute personal outcomes to their own efforts and abilities (Rotter, 1966). Persons with a predominantly internal orientation view outcomes as more controlled by themselves, as opposed to those with a more external orientation who believe that external forces or situations have the most powerful effect on personal outcomes. Thus, on an Internal-External continuum given individuals can be thought of as having a global sense of control (or lack of control) over events in their lives.

People's beliefs about the determinants or sources of their health have been found to affect health-related behaviors and actual health outcomes (Riggs & Noland, 1984, p. 431). In 1973 Strickland summarized 11 studies that indicated a positive relationship between an internal locus of control and physical health or well being. As a result of such studies an extension of the locus of control concept emerged and has become known as health locus of control. It has been hypothesized that "internal" individuals are more likely than "externals" to engage in preventive health behaviors (Taylor, 1986). Most of the research reviewed by Strickland (1978) supported this hypothesis and also found that "internals" were (a) more likely to take responsibility for their own health, (b) may practice better health behaviors, (c)

protect themselves more carefully against accidents, and (d) gather more health information than do "externals."

In a study with epileptic patients, DeVellis, Devellis, Wallston, and Wallston (1980) found that information-seeking behaviors were associated in theoretically expected ways with locus of control scores. Also, according to social learning theory, those with internal orientations behave in a more predictable fashion than their "external" counterparts.

Studies treating health locus of control as an outcome variable have also suggested that the construct behaves in theoretically expected ways. For example, non-experimental status studies have generally reported expected results (i.e., people with chronic illness perceive themselves to have less control over their health than do healthy individuals). Wallston and Wallston (1981) reported the following:

> Chronically ill patients look as expected with relatively low beliefs in health internality and relatively high beliefs in health externality, both chance and powerful others. Healthy adults differ from college students in their greater beliefs in powerful others and lower beliefs in health internality. (p. 217)

Similarly, Winefield (1982, p. 617) reported that "Hospitalized acutely ill men expressed greater confidence than health controls that powerful others such as physicians can control their health; this seems likely to be an adaptive response to the dependence and

uncertainty of their situation."

However, it has become clear that a generalized measure of locus of control, while appropriate for prediction of generalized behavior, is inappropriate for more specific predictions such as health locus of control (Rotter, 1975, 1982). Some researchers have argued that "The more specific the instrument, the better the prediction of particular behavior in a particular situation" (Wallston, Wallston, Kaplan, & Maides, 1976, p. 584). Lefcourt (1981) reviewed locus of control research and concluded that "global measures afford only weak predictive power to the assumed criteria. The more predictive a measure, the greater will be the power of that measure in predicting the relevant criteria" (p. 386).

In 1982, Saltzer conducted an empirical study confirming these theoretical expectations. Using both general and outcome-specific locus of control measures Saltzer reported that while the outcome-specific measures were able to predict experimental outcomes, the general measures "would not have led to the predicted findings" (pp. 626-627).

The Multidimensional Health Locus of Control (MHLC) Scales developed by Wallston, Wallston, and DeVellis (1978) probably represents the most popular and widely used instrument for assessing beliefs about health locus of control. Russell and Ludenia (1983, pp.453-454) noted that "The MHLC Scales have been employed in a substantial number of studies that investigated various health conditions and health-related behaviors with a wide

range of populations." As implied by its name, the MHLC seeks to measure health locus of control along multiple dimensions which were originally conceptualized by Levenson (1974); they are Powerful Others (PO), Chance (C), and Internal (I).

Efforts have been made to investigate the psychometric characteristics of the MHLC Scales with various populations. For example, the internal consistency reliability of scores on the MHLC Scales has been investigated (Marshall, Collins & Crooks, 1990; Thompson, Butcher, & Berenson, 1987). Various factor analytic methods have been used to investigate the construct validity of scores from the Scales including principal components analysis (Marshall, et al., 1990; Thompson et al., 1987), second order exploratory analysis (Thompson, Webber, & Berenson, 1990), and confirmatory first-order factor analysis (Thompson, Webber, & Berenson, 1987, 1988).

Several studies have investigated the factor structure of scores from the MHLC Scales with various populations and mixed results have been reported. Russell and Ludenia (1983) conducted such a study with an inpatient alcoholic population and concluded that the instrument was factorily valid and that three distinct factors emerged "that fulfill the notions of parsimony, psychological meaningfulness, and simple structure" (p. 458). The MHLC Scales were also found to be suitable for use with psychiatric patients though the support for the three-factor structure was "qualified" (Wall, Hinrichsen, & Pollack, 1989). Eachus (1990) found that in use with health professionals the existence and

validity of the Internal, Powerful Others, and Chance scales was confirmed. Results from a study by Marshall and his associates (1990) also supported categorization of the MHLC Scales into the a priori subscales when used with a sample of Veterans Administration outpatients. When used with elementary school students (Thompson et al., 1987), the construct validity of the MHLC Scales was again supported.

However, some researchers have reported less supportive results when the instrument was used with other populations. O'Looney and Barrett (1983, p. 217) reported that in a sample of British university students "a sex difference appeared in the factor structure of the test such that the male sample yielded only two factors while the female sample yielded the three factors as expected." Using a sample of first year medical and dental students Winefield (1982) found that "the internal structure of the MHLC obtained by factor analysis supported the concept of Internal and Powerful Others subscales, but there was less coherence in the Chance subscale" (p. 615). Lastly, in a sample of psychiatric hospital staff, "the factor structure [of the MHLC] failed to replicate the original multidimensional construct" (Cooper & Fraboni, 1988, p. 536). Thus, the populations with which the MHLC Scales can be confidently used is as yet unclear.

The present study sought to investigate the measurement quality and utility of the MHLC Scales when used with adults who solicit intervention to promote health. More specifically, two research questions were addressed: (a) what factors underlie MHLC

responses when the measure is administered to adults seeking health promotion interventions?, and (b) what variables predispose individuals to certain patterns of locus of control profiles?

## Method

### Subjects and Procedure

Subjects in the study were 678 adults employed as faculty or staff at a large southwestern state university. There were approximately equal numbers of males and females. Mean age of the subjects was 41.3 years (SD = 11.4). Most subjects (64.9%) were married and most (84.7%) were Caucasian with approximately equal distributions of African-Americans, Hispanics, and Orientals.

All subjects completed the MHLC Scales (Form A) as part of a voluntary health assessment program provided at low cost by the university's Department of Health Promotion. Demographic, lifestyle, and medical history information were collected from each subject.

### Analysis

Many researchers have acknowledged the importance of factor analytic investigations in the efforts to develop structural models relating constructs and in validating measures of instruments of constructs. Nunnally (1978, p. 111) noted that construct validity has been spoken of as "trait validity" and "factorial validity." Gorsuch (1983) suggested the following:

> A prime use of factor analysis has been in the development of both the theoretical constructs for an area and the operational representatives for the

> theoretical constructs . . . If a theory has clearly defined constructs, then scales can be directly built to embody those constructs. However, it is often the case that the theories in a particular area are sufficiently underdeveloped so that the constructs are not clearly defined. (pp. 350-351)

Therefore, factor analysis was the method used in the present study to investigate the integrity of scores from the MHLC Scales.

## Results

The first research question, which involved analysis of the factor structure of the MHLC Scales for the present sample, was addressed through principal components analysis. A three-factor structure was rotated to the varimax criterion. The resulting structure is presented in Table 1, along with eigenvalues *prior to rotation* (Thompson, 1989) and the distribution of trace after rotation.

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INSERT TABLE 1 ABOUT HERE

The three factors accounted for 41.5 percent of the total variance. However, one item (#7) designed to measure the Powerful Others construct was found to have a communality of only .099, indicating that the item did not correlate substantially with any of the factors.

The second research question was addressed through computation of factor scores for the three factors. Scores on the three MHLC factors were related with age ($p=.0001$), with resting heart rate

(p=.0412), and with percent fat body composition (p=.0286) but not with diastolic blood pressure (p>.05). Mean scores of the subjects with lung problems (n=43) were not significantly different from the means of subjects who did not report such problems.

## Discussion

Overall, the results of this analysis support the three dimensional structure set forth by Wallston, Wallston, and DeVellis (1978). All but one of the 18 items from the MHLC Scales loaded on the appropriate a priori subscales.

Findings similar to those in the present study regarding item #7 have been reported in previous research. In their study using Veterans Administration outpatients Marshall and his associates (1990) found very similar loadings among the three factors, also accounting for 41% of the total variance. Further, item #7 "failed to load on the Powerful Others subscale" (Marshall et al., 1990, p. 184). Other studies, including Coelho (1985), Russell and Ludenia (1983), and Umlauf and Frank (1986) also reported similar results concerning item #7.

The results in the present study suggest that the instrument tends to yield valid scores when used with adults who seek physical education interventions as part of voluntary health promotion activities. Therefore, the measure might be suitable for evaluating intervention programs designed to affect such subjects' health attitudes or behaviors. Parcel and Meyer (1978) have noted the following:

> A frequently stated goal for health education

> programs for children [and adults as well] is development of self-responsibility for health behavior. How well health education programs meet this goal is difficult to assess. The expected impact of such a health program is often remote from the time the program occurs. Changes in intermediate variables such as knowledge and attitudes are often sought. (p. 149)

Riggs and Noland (1984) have suggested that the measure might also be used by educators for intervention purposes. For example, one might assign subjects to intervention methods that are most likely to achieve desired outcomes.

The present study adds to the body of research that suggests that the MHLC Scales are construct valid for use with certain populations. However, it seems that some item revision may be in order and that the measure should be used and interpreted with some caution. This is especially true if the MHLC is to be used with populations other than those with which factor analytic studies have been reported.

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Table 1

| ITEM | FACTOR I | II | III | $h^2$ |
|---|---|---|---|---|
| CLC9 | 0.707 | 0.024 | 0.112 | 0.513 |
| CLC16 | 0.642 | 0.081 | 0.201 | 0.460 |
| CLC11 | 0.631 | -0.110 | 0.096 | 0.419 |
| CLC15 | 0.612 | -0.181 | 0.080 | 0.413 |
| CLC2 | 0.503 | -0.184 | 0.081 | 0.294 |
| CLC4 | 0.466 | 0.050 | 0.083 | 0.227 |
| ILC13 | -0.133 | 0.695 | 0.112 | 0.513 |
| ILC17 | -0.194 | 0.687 | 0.116 | 0.523 |
| ILC12 | -0.188 | 0.630 | -0.039 | 0.434 |
| ILC1 | -0.030 | 0.612 | -0.063 | 0.380 |
| ILC6 | -0.105 | 0.569 | -0.156 | 0.359 |
| ILC8 | 0.244 | 0.525 | 0.006 | 0.335 |
| PLC7 | 0.132 | 0.264 | 0.110 | 0.099 |
| PLC5 | -0.013 | -0.043 | 0.719 | 0.518 |
| PLC3 | -0.023 | 0.015 | 0.704 | 0.496 |
| PLC18 | 0.325 | -0.026 | 0.656 | 0.536 |
| PLC10 | 0.321 | 0.014 | 0.648 | 0.523 |
| PLC14 | 0.271 | 0.103 | 0.594 | 0.437 |
| Prerotation Eigenvalues | 3.526 | 2.533 | 1.432 | |
| Postrotation Trace | 2.617 | 2.497 | 2.364 | 7.478 |